

IB95/107568  
REPUBLIC VAN SUID-AFRIKA

Sertifikaat

Certificate

PATENTKANTOOR



REC'D 08 DEC 1999  
WIPO

PATENT OFFICE

DEPARTEMENT VAN HANDEL  
EN NYWERHEID

REPUBLIC OF SOUTH AFRICA

PCT  
DEPARTMENT OF TRADE  
AND INDUSTRY

Hiermee word gesertifiseer dat  
This is to certify that

the documents annexed hereto are true copies of:

Application forms P.1 and P.3, provisional specification and drawings of South African Patent Application No. 98/9243 as originally filed in the Republic of South Africa on 9 October 1998 in the name of ANGLO AMERICAN INDUSTRIAL CORPORATION LIMITED for an invention entitled: "A WINDSCREEN WIPER";

AND it is further certified that Patent Application No. 98/9243 and the invention forming the subject matter of the patent application, together with all priority rights flowing from the patent application under the provisions of the International Convention were duly assigned in accordance with law from ANGLO AMERICAN INDUSTRIAL CORPORATION LIMITED to TRICO PRODUCTS CORPORATION by virtue of Deed of Assignment effective from 14 November 1998 which Deed of Assignment was duly registered at the Patent Office, Pretoria, on 19 May 1999.

Geteken te  
Signed at

PRETORIA

in die Republiek van Suid-Afrika, hierdie  
in the Republic of South Africa, this

3rd day of

November 1999

PRIORITY  
DOCUMENT

SUBMITTED OR TRANSMITTED IN  
COMPLIANCE WITH RULE 17.1(a) OR (b)

*[Signature]*  
Registrateur van Patente  
Registrar of Patents

REPUBLIC OF SOUTH AFRICA  
PATENTS ACT, 1978  
APPLICATION FOR A PATENT  
ACKNOWLEDGEMENT OF RECEIPT  
(Section 30(1) Regulation 22)

REPUBLIC OF SOUTH AFRICA  
FORM P.1 REVENUE  
(to be lodged in duplicate)

1998

R 060.00

THE GRANT OF A PATENT IS HEREBY REQUESTED BY THE UNDERMENTIONED APPLICANT  
ON THE BASIS OF THE PRESENT APPLICATION FILED IN DUPLICATE

INKOMSTE  
REPUBLIC VAN SUID AFRIKA  
HASR 370

A & A REF: V13049 AL

PATENT APPLICATION NO.	
21 01	989243
71	FULL NAMES(S) OF APPLICANT(S)

~~ANGLO-AMERICAN INDUSTRIAL CORPORATION LIMITED~~  
TRIM PRODUCTS CORPORATION

AANSOEKERS VERVANG  
APPLICANTS SUBSTITUTED  
19/5/99

ADDRESS(ES) OF APPLICANT(S)

44 Main Street, Johannesburg,  
Gauteng, Republic of South Africa.

54 TITLE OF INVENTION

"A WINDSCREEN WIPER"

Only the items marked with an "X" in the blocks below are applicable.

- ☐ THE APPLICANT CLAIMS PRIORITY AS SET OUT ON THE ACCOMPANYING FORM P.2. The earliest priority claimed is Country: No: Date:
- ☐ THE APPLICATION IS FOR A PATENT OF ADDITION TO PATENT APPLICATION NO. |21|01|
- ☐ THIS APPLICATION IS A FRESH APPLICATION IN TERMS OF SECTION 37 AND BASED ON APPLICATION NO. |21|01|

THIS APPLICATION IS ACCOMPANIED BY:

- ☒ A single copy of a provisional specification of 7 pages.
- ☒ Drawings of 3 sheets.
- ☐ Publication particulars and abstract (Form P.8 in duplicate) (for complete only).
- ☐ A copy of Figure of the drawings (if any) for the abstract (for complete only).
- ☒ An assignment of invention.
- ☐ Certified priority document(s) (State quantity): .....
- ☐ Translation of the priority document(s).
- ☐ An assignment of priority rights.
- ☐ A copy of Form P.2 and the specification of RSA Patent Application No. |21|01|
- ☒ A Form P.2 in duplicate.
- ☒ A declaration and power of attorney on Form P.3.
- ☐ Request for ante-dating on Form P.4.
- ☐ Request for classification on Form P.9.
- ☐ Request for delay of acceptance on Form P.4.
- ☒ A copy of Form P.1

74 ADDRESS FOR SERVICE: Adams & Adams, Pretoria

DATED THIS 9TH DAY OF OCTOBER

1998

A LEWIS

ADAMS & ADAMS  
APPLICANTS PATENT ATTORNEYS

The duplicate will be returned to the applicant's address for service as proof of lodging but is not valid unless endorsed with official stamp.

RECEIVED
REGISTRAR OF PATENTS, DESIGNS, OFF TRADE MARKS AND COPYRIGHT
1998-10-09
REGISTRAR OF PATENTS
REGISTRATEUR VAN PATENTE, MODELLE, HANDELSMERKE EN OUTEUSREG

## DECLARATION AND POWER OF ATTORNEY

(Section 30 - Regulation 8, 22(i)(c) and 33)

- 1.4.98

R 002.00

PATENT APPLICATION NO.

A &amp; A REF: V13049 AL

21 01

989243

LODGING DATE

INKORASTE

REPUBLIEK VAN SUID AFRIKA

HASR

370

FULL NAME(S) OF APPLICANT(S)

71

ANGLO AMERICAN INDUSTRIAL CORPORATION LIMITED



FULL NAME(S) OF INVENTOR(S)

72

ADRIAAN RETIEF SWANEPOEL

EARLIEST PRIORITY CLAIMED

COUNTRY

NUMBER

DATE

33 NIL

31 NIL

32 NIL

NOTE: The country must be indicated by its International Abbreviation - see schedule 4 of the Regulations

TITLE OF INVENTION

54

"A WINDSCREEN WIPER"

I/We MICHAEL JOHN NAYLER AND CAIN LESLIE FARREL

hereby declare that :-

1. ~~I/We am/are the applicant(s) mentioned above;~~

2. I/We have been authorized by the applicant(s) to make this declaration and have knowledge of the facts herein stated in the capacity of DIRECTOR &amp; NOMINEE OF SECRETARIES of the applicant(s);

3. the inventor(s) of the abovementioned invention is/are the person(s) named above and the applicant(s) has/have acquired the right to apply by virtue of an assignment from the inventor(s);

4. to the best of my/our knowledge and belief, if a patent is granted on the application, there will be no lawful ground for the revocation of the patent;

5. ~~this is a convention application and the earliest application from which priority is claimed as set out above is the first application in a convention country in respect of the invention claimed in any of the claims; and~~

6. the partners and qualified staff of the firm of ADAMS &amp; ADAMS, patent attorneys, are authorised, jointly and severally, with powers of substitution and revocation, to represent the applicant(s) in this application and to be the address for service of the applicant(s) while the application is pending and after a patent has been granted on the application.

SIGNED AT JOHANNESBURG

THIS 10TH

DAY OF FEBRUARY

19 98

ANGLO AMERICAN CORPORATION  
OF SOUTH AFRICA LIMITED  
SecretariesFor and  
On behalf of:DIRECTOR SIGNATURE(S)  
(no legalization necessary)Per .....  
Senior Divisional Secretary

ANGLO AMERICAN INDUSTRIAL CORPORATION LIMITED

In the case of application in the name of a company, partnership or firm, give full names of signatory/signatories, delete paragraph 1, and enter capacity of each signatory in paragraph 2.

If the applicant is a natural person, delete paragraph 2.

If the right to apply is not by virtue of an assignment from the inventor(s), delete "an assignment from the inventor(s)" and give details of acquisition of right.

For non-convention applications, delete paragraph 5.

ADAMS & ADAMS  
PATENT ATTORNEYS  
PRETORIA

FORM P6

REPUBLIC OF SOUTH AFRICA  
Patents Act, 1978

# PROVISIONAL SPECIFICATION

(Section 30 (1) - Regulation 27)

OFFICIAL APPLICATION NO.

21 01

989243

LODGING DATE

22 9 October 1998

FULL NAMES(S) OF APPLICANT(S)

71

~~ANGLO AMERICAN INDUSTRIAL CORPORATION LIMITED~~

TRIC PRODUCE CORPORATION

AANSOEKERS VERVANG  
APPLICANTS SUBSTITUTED  
19/5/99

FULL NAME(S) OF INVENTOR(S)

72

ADRIAAN RETIEF SWANEPOEL

TITLE OF INVENTION

54

"A WINDSCREEN WIPER"

This invention relates to a windscreen wiper, which is also known as a windshield wiper.

5 The invention relates in particular to a windscreen wiper which has a curved backbone and which may have a varying width and/or thickness. It will be appreciated by those skilled in the art that the backbone may be in the form of a beam that is curved in a plane or may have a compound curvature. The beam will have width and thickness dimensions. The beam will also have a radius of curvature at each point along its length.

10 The applicant has conducted substantial analysis and experimentation and believes that it has found a relationship between the thickness, the beam material's Young's modulus and the total length of the beam and the width, the beam material's Young's modulus and the total length, which provides a windscreen  
15 wiper that operates in an improved manner.

According to a first aspect of the invention there is provided a windscreen  
wiper which includes

an elongate curved backbone which is of a resiliently flexible material having

a Young's modulus of between 50 to 350 GPa, has a substantially spatially consolidated cross-sectional profile at substantially all points along its length, in which the magnitude of the width at substantially the widest point along the backbone,  $W_m$  (expressed in millimetres) is at most  $(-8.889 \cdot 10^{-5} * E + 0.05378)$

\*  $L - 5.25$ , where  $L$  is the total length of the backbone expressed in millimetres and  $E$  is the Young's modulus of the backbone material expressed in GPa.

Further according to this aspect, there is provided a windscreen wiper which includes

an elongate curved backbone which is of a resiliently flexible material having a Young's modulus of between 50 to 350 GPa, has a substantially spatially consolidated cross-sectional profile at substantially all points along its length, in which the ratio of the magnitude of the width at substantially the widest point along the backbone to the total length  $L$  of the backbone,  $R_w$  is at most  $(-8.889 \cdot 10^{-5} * E + 0.05378) - 5.25/L$ , where  $L$  is the total length of the backbone expressed in millimetres and  $E$  is the Young's modulus of the backbone material expressed in GPa.

According to a second aspect of the invention there is provided a windscreen wiper which includes

an elongate curved backbone which is of a resiliently flexible material having a Young's modulus of between 50 to 350 GPa, has a substantially spatially consolidated cross-sectional profile at substantially all points along its length, in which the magnitude of the thickness at substantially the thickest point along the

backbone,  $T_m$  (expressed in millimetres) is at most  $0.0007 * L - 0.0027407 * E + 1.37814$ , where  $L$  is the total length of the backbone expressed in millimetres and  $E$  is the Young's modulus of the backbone material expressed in GPa.

5 Further according to this aspect, there is provided a windscreen wiper which includes

an elongate curved backbone which is of a resiliently flexible material having a Young's modulus of between 50 to 350 GPa, has a substantially spatially consolidated cross-sectional profile at substantially all points along its length, in  
10 which the ratio of the magnitude of the thickness at substantially the thickest point along the backbone to the total length  $L$  of the backbone,  $R_t$  is at most  $0.0007 - (0.0027407 * E + 1.37814)/L$ , where  $L$  is the total length of the backbone expressed in millimetres and  $E$  is the Young's modulus of the backbone material expressed in GPa.

15 The material of the backbone may be a composite material. In this case, the Young's modulus will be that of the composite material.

In this specification, the term "spatially consolidated" is to be understood,  
20 unless the context clearly indicates otherwise, to mean that the actual perimeter of a cross-section coincides with the shortest possible perimeter encapsulating that cross-section.

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The total length of the backbone may be between about 300mm to

1200mm.

The invention is now described, by way of example with reference to the accompanying drawings, in which:

5        Figure 1 shows a schematic perspective view from above of a windscreen wiper in accordance with the invention;

Figure 2 shows a side view of the wiper of Figure 1 in an unloaded free-form condition;

10        Figure 3 shows a graph indicating the variation of width of the backbone of the windscreen wiper shown in Figures 1 and 2;

Figure 4 shows a graph indicating the variation of thickness of the backbone of the windscreen wiper shown in Figures 1 and 2; and

Figure 5 shows a graph indicating the free-form co-ordinates of the centre line of the backbone of the windscreen wiper shown in Figures 1 and 2.

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In the drawings, a windscreen wiper in accordance with the invention is generally designated by the reference numeral 10. The windscreen wiper 10 includes a backbone 12 which is in the form of a beam and a rubber wiper blade 14. The beam is made from spring steel having a Young's modulus of 200 GPa. The length of the beam is 600mm. The beam has a rectangular substantially spatially consolidated cross-sectional profile at all points along its length. Thus, the beam has a width dimension  $W$  and a thickness dimension  $T$  as shown in

20

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Figure 1. The beam tapers both in width and thickness from its centre toward its free ends or tips as shown in Figure 3 and Figure 4 respectively. Figure 3



illustrates the beam width (in millimetres) at various positions along the length of the beam, which is also measured in millimetres. Figure 4 illustrates the thickness of the beam (in millimetres) at various positions along the length of the beam which is also measured in millimetres.

5

The beam is curved longitudinally, in a plane, with a predetermined radius of curvature  $R$  at every point along its length as shown in Figure 2. Figure 5 shows the beam centre line co-ordinates relative to the position along the length of the beam (in millimetres).

10

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With the given formulas, it can be determined if the wiper, as described in the drawings conforms to the invention. The width of the beam 12 at its widest point along the beam 12,  $W_m$  (expressed in millimetres) is 15.4 as shown in Figure 3. According to the first aspect of the invention, the magnitude of the width at the widest point along the beam 12,  $W_m$  (expressed in millimetres), where  $L$  is 600 mm and  $E$  is 200 GPa, should be less than  $(-8.889 \cdot 10^{-5} * E + 0.05378) * L - 5.25$   
 $= (-8.889 \cdot 10^{-5} * 200 + 0.05378) * 600 - 5.25 = 16,35$  mm. The width  $W_m$  of the wiper therefore falls within the scope of the invention.

20

The thickness of the beam 12 at the thickest point along the beam 12,  $T_m$  (expressed in millimetres) is 1.2 mm as shown in Figure 4. According to the second aspect of the invention the magnitude of the thickness at the thickest point along the beam 12,  $T_m$  (expressed in millimetres), where  $L$  is 600 mm and  $E$  is 200 GPa, should be less than  $0.0007 * L - 0.0027407 * E + 1.37814 = 0.0007 *$

$600 - 0.0027407 * 200 + 1.37814 = 1,25 \text{ mm}$ . The thickness  $T_m$  of the wiper therefore also falls with the scope of the invention.

DATED THIS 9TH DAY OF OCTOBER 1998



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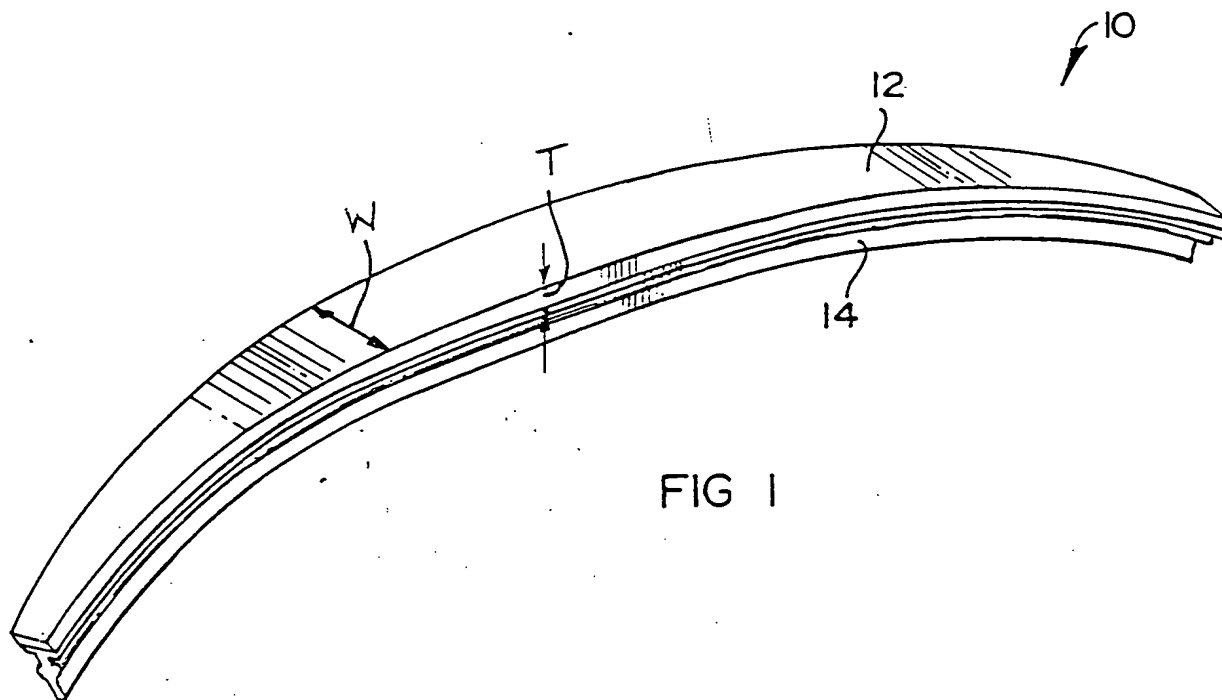


FIG 1

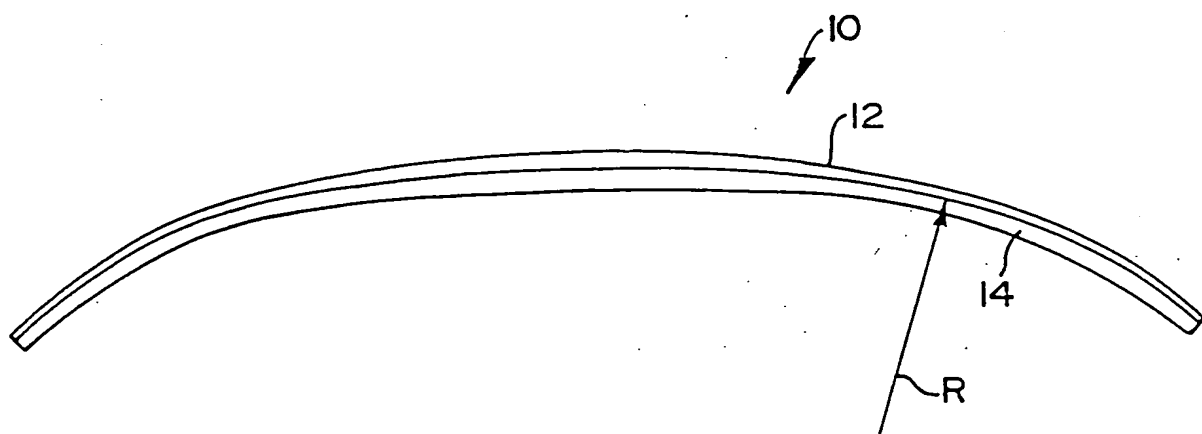


FIG 2

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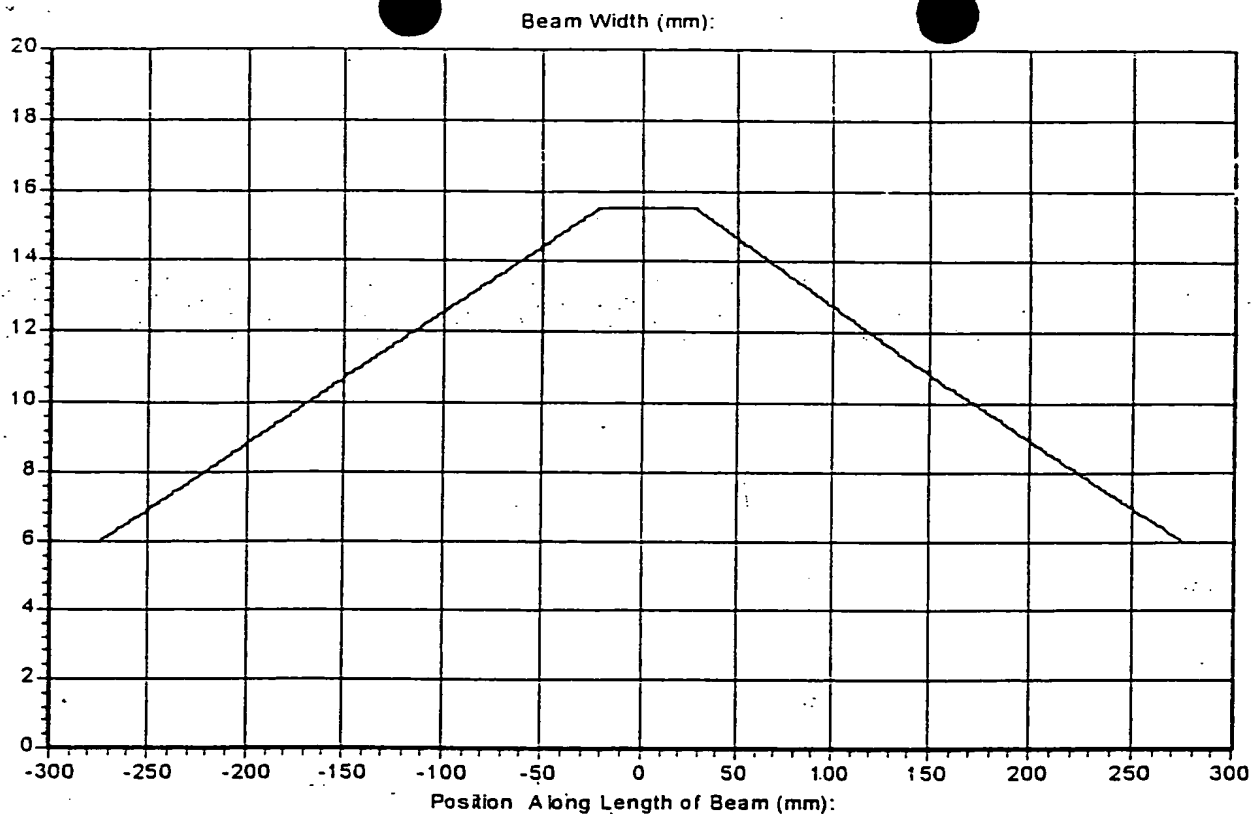


Figure 3

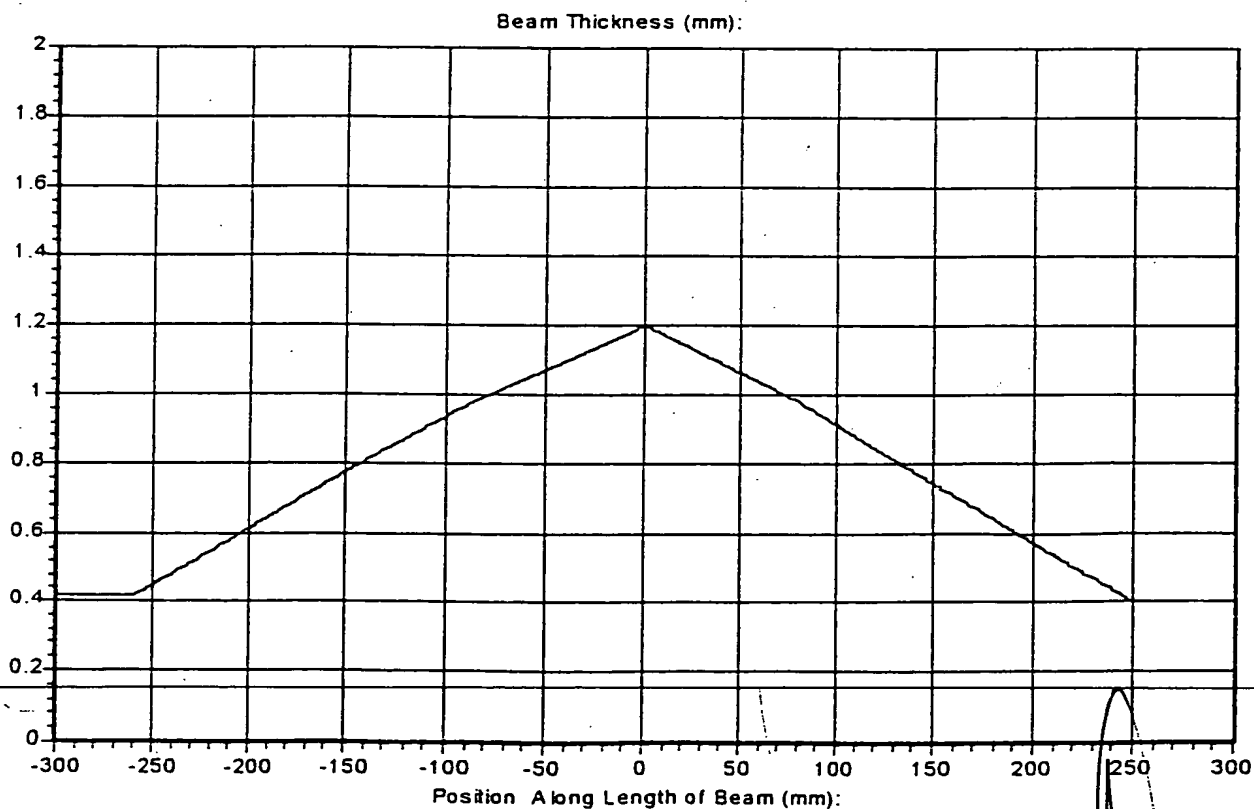


Figure 4

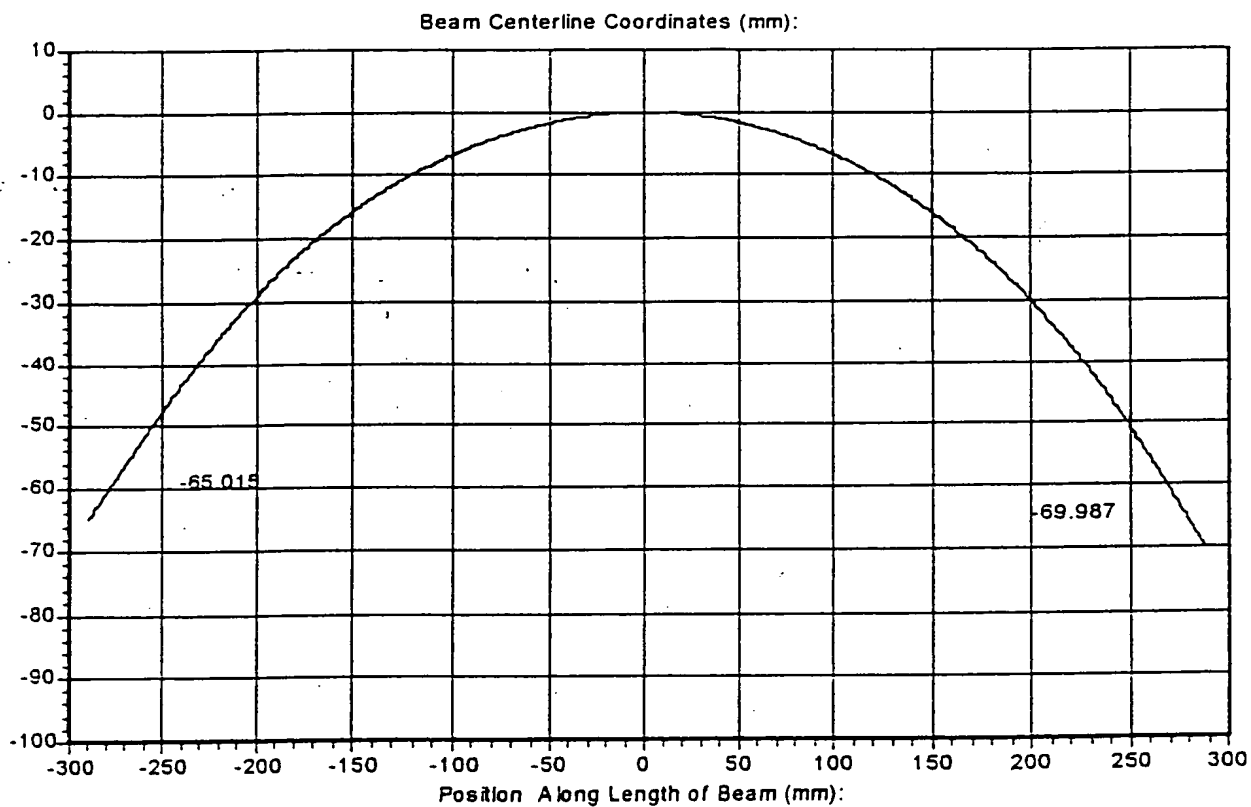


Figure 5

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